

ILLUMINATION ASSEMBLY USABLE WITH A PLURALITY OF DEVICES

1 BACKGROUND OF THE INVENTION

2 Claim of Priority

3 The present application is based on and a claim to priority is
4 made under 35 U.S.C. Section 119(e) to provisional patent
5 application currently pending in the U.S. Patent and Trademark
6 Office having Serial No. 60/465,538 and a filing date of April 25,
7 2003, which is incorporated in its entirety herein by reference.

8

9 Field of the Invention

10 This invention relates to an illumination assembly structured
11 to be removably and adjustably connected to or integrated within
12 any of a variety of utilitarian devices for purposes of effectively
13 illuminating an intended work area of the device. One or more
14 light sources include one or more light generating elements,
15 preferably in the form of light emitting diodes energized by a
16 contained power supply, wherein the light source and power supply
17 have a sufficiently reduced dimension to be mounted on or
18 incorporated within the various devices.

19

20 DESCRIPTION OF THE RELATED ART

21 Technology is a major catalyst in the product market. As a
22 practical consequence, many technological advances in a specific
23 area or industry will directly or residually impact other areas in

1 today's modern society. The spectrum related to illumination has
2 enjoyed substantially constant improvement since the advent of the
3 light bulb. The light emitting diode or "LED" is an extremely
4 popular light generating element which has encountered significant
5 improvements in both performance and economy of voltage. The
6 brightness achieved by the technologically advanced LED has
7 expanded its use in areas including taillights on vehicles,
8 flashlights, medical equipment, hobby craft, jewelry, and most
9 especially electronics. However, it is generally recognized that
10 the LED market has not enjoyed the innovative exploitation in
11 certain segments of modern industry. By way of example, devices
12 including medical instruments, mechanical tools, and other
13 utilitarian devices, while frequently requiring illuminated
14 conditions for maximum efficiency, do not often include a self
15 contained or readily adaptable light source. Accordingly, in this
16 industry as well as numerous other market segments, individuals
17 continue to struggle with the use of such devices.

18 Therefore, it is clear that the need and desirability for an
19 external light source incorporated within an improved illumination
20 assembly would overcome many of the problems currently existing
21 with the use of the utilitarian devices of the type set forth
22 above. Illumination assemblies specifically designed to be used
23 with tools, devices such as tweezers, medical instruments, and the
24 like, while attempting to overcome problems of the type set forth
25 above, have not been completely successful as evidenced by their

1 lack of availability on the commercial market. Problems associated
2 with the use of such known or conventional structures include the
3 location, configuration and/or structuring of known external light
4 sources in a manner which creates shadows due to "back lighting"
5 rather than accomplishing targeted and pinpoint direction of an
6 illumination field on to an intended work area of the instrument in
7 question. Further, the available light structures, particularly
8 those of the type used with utilitarian devices such tools and
9 instruments counter other disadvantages such as being of excessive
10 weight or size thereby frequently interfering with the intended or
11 conventional operation of the device during its use.

12 By way of example, certain mechanical tools such as, but not
13 limited to a screwdriver structure is known to incorporate a rear-
14 lighted handle base. However, reluctance on the part of the
15 manufacturer or tool designer to completely redesign the overall
16 structural and operative features of such a device results in the
17 existing screwdriver being heavy, bulky and therefore usable for
18 only limited purposes. Understandably, the reluctance on the part
19 of manufactures to completely redesign a line of tools has resulted
20 in the lack of a variety of different instruments, tools, etc. of
21 effective and efficient associated light sources.

22 Based on the above there is a significant and long recognized
23 need for an illumination assembly either in the form of a removable
24 and adjustable exteriorly mounted structure or an illumination
25 assembly integrated into the tool or instrument itself. Such an

1 improved illumination assembly would provide the desired and
2 effective lighting of a given or intended work area associated with
3 the use of the instrument, tool or device. Further, such an
4 improved illumination assembly should demonstrate sufficient
5 versatility to allow selective orientation or adjustment of the
6 light source, preferably in the form of one or more LED's so as to
7 ensure proper illumination of the work area in question. Further,
8 such an improved illumination assembly should be structured so as
9 to accomplish quick and easy adaptation to a variety of different
10 devices including tweezers, screwdrivers, hex keys, wrenches,
11 ratchets, pens, pencils, magnetic pickups, pliers, drills, saws,
12 mechanical tools of all types, electronic tools as well as numerous
13 other utilitarian devices. In addition, such a preferred and
14 improved illumination assembly should be designed and structured so
15 as to be available to the consuming public at a reasonable cost and
16 not interfere with the intended use or operation of the associated
17 device. Finally, such a preferred illumination assembly should be
18 of a reduced or comparable size and configuration to correspond to
19 that of the device or instrument with which it is used.

20

21 SUMMARY OF THE INVENTION

22 The present invention is directed to an illumination assembly
23 usable with a variety of different devices by being removably and
24 adjustably attached thereto. In alternative preferred embodiments
25 the illumination assembly of the present invention should be

1 structured to be integrated within the structure of the individual
2 device. The versatility of the various preferred embodiments of
3 the present invention is demonstrated by the wide variety of
4 devices with which it may be used. As will be more evident herein
5 after, such devices include mechanical tools, medical instruments,
6 household implements or utensils, and a variety of other
7 utilitarian devices which are normally, but not exclusively,
8 operated by being hand-held. As will also be apparent, certain
9 preferred embodiments of the illumination assembly of the present
10 invention may be more adaptable for use with specific instruments,
11 tools, utensils, etc. than others. By way of example, the
12 structure, size and configuration of certain utilitarian devices
13 render them more easily used with removably and/or adjustably
14 mounted illumination assemblies rather than with the embodiments
15 which are integrated or "built-in" as part of the original
16 formation or manufacture of the tool, instrument or like device.

17 More specifically, the illumination assembly of the present
18 invention in its various preferred embodiments includes a light
19 source comprising at least one generating element. Substantially
20 all of the embodiments described hereinafter will be represented as
21 using a light emitting diode as the light generating element of the
22 light source. The intended spirit and scope of the present
23 invention is not meant to exclude other types of light generating
24 elements. However, adaptability of the modern day, advanced LED
25 to the various structural modifications of the illumination

1 assembly as used in combination with the diverse instruments or
2 tools as set forth above makes the LED the preferred light
3 generating element to be used.

4 Accordingly, the light source may comprise at least one LED
5 but in certain preferred embodiments a plurality of LED's. In
6 addition, a power supply is provided preferably, but not
7 exclusively, in direct association with the light source such as
8 being mounted adjacent thereto and in direct electrical connection
9 therewith. The power supply may take the form of a reduced size
10 battery of the type known in the art and commercially available.
11 Such batteries are extremely small and are replaceable as needed to
12 provide adequate power to the one or more LED's defining the light
13 source. Moreover, the power supply may be cooperatively mounted,
14 positioned or located in a manner such that the light source and
15 the power supply are secured to or mounted on one of the plurality
16 of devices as an integrated unit. However, in at least one
17 preferred embodiment of the present invention the power supply and
18 the light source may be removably connected to one another by
19 virtue of the provision of a "plug-in" type of electrical
20 interface. As with the other operative components of the various
21 embodiments of the illumination assembly, the coupling interface is
22 appropriately dimensioned and disposed and thereby facilitates the
23 removable connection between the power supply and the light source.

24 Another important feature of at least some of the preferred
25 embodiments of the present invention is the provision of a mounting

1 assembly. The mounting assembly is connected in supporting
2 relation to at least the light source but more preferably to both
3 the light source and the power supply. In each of the
4 corresponding embodiments, the mounting assembly is structured to
5 adjustably secure the light source on the device in a position
6 which facilitates illumination of a predetermined work area
7 thereof. In order to better facilitate a preferred and selective
8 illumination of the predetermined work area, the light source and
9 the mounting assembly are cooperatively structured to facilitate
10 the adjustable positioning of the light source on the device. In
11 addition, certain preferred embodiments of the illumination
12 assembly provide for a selective orientation of the one or more
13 LED's defining the light source relative to the work area to
14 accomplish the aforementioned preferred and effective illumination
15 of the work area.

16 Accordingly, one embodiment of the mounting assembly of the
17 present invention comprises a sleeve having a hollow interior and
18 terminating in oppositely disposed open ends. The sleeve may be
19 formed of a flexible, at least minimally elastic or expandable
20 material which is dimensioned and configured to provide a gripping
21 type action on the portion of the device to which it is attached.
22 However, it is emphasized that such a gripping engagement will
23 still permit selective positioning of the sleeve, as well as the
24 light source and power supply connected thereto relative to the
25 device on which it is mounted. Such selective positioning allows

1 the light source to be efficiently disposed in the aforementioned
2 preferred orientation to facilitate better illumination of the work
3 area. Therefore, due to the resilient or expandable nature of the
4 material from which at least one embodiment of the mounting sleeve
5 is formed, the sleeve may have a continuous or closed peripheral
6 configuration which facilitates a sliding, surrounding engagement
7 of the mounting sleeve on the device.

8 As one alternative embodiment to the closed continuous
9 configuration of the sleeve, the sleeve may include an access
10 opening extending substantially along the entire length thereof.
11 The sleeve may then be selectively disposed in either an open or
12 closed position. A closure assembly may be associated with the
13 longitudinal or otherwise peripheral portions of the access opening
14 to maintain it in a closed position thereby assuring its
15 maintenance in an intended, operative location on the device.

16 Additional alternative embodiments of the mounting sleeve
17 include it being formed from a substantially rigid material
18 dimensioned, configured and otherwise structured to substantially
19 correspond to a portion of the tool, instrument or like device to
20 which it is secured. This latter rigid material embodiment may be
21 best suited for larger instruments such as mechanical tools as will
22 be explained in greater detail hereinafter.

23 Yet another embodiment of the mounting assembly includes a
24 clip or clamp assembly comprising a support platform for the light
25 source and preferably the power supply. The support platform is

1 connected to two outwardly extending flanges which are at least
2 partially movable relative to the platform. A biasing structure or
3 assembly may be associated with the clamp assembly and may
4 preferably be provided in the form of a biasing spring or member.
5 The biasing member is attachable to the clamp assembly in a manner
6 which normally biases the flanges into at least partially
7 surrounding, gripping engagement with a portion of the device on
8 which it is mounted. Alternatively, the biasing structure can be
9 inherently formed in the platform and flanges due to it being
10 molded by an inherently resilient or flexible material such as
11 plastic, metal, etc.

12 Another feature of a plurality of the preferred embodiments of
13 the illumination assembly of the present invention include the one
14 or more LED's being movable and therefore adjustable relative to
15 the intended work area, the device on which it is mounted, the
16 mounting assembly and/or other ones of a plurality of LED's
17 directly associated therewith. Such selective adjustability of the
18 one or more LED's further facilitates the orientation thereof into
19 a position which best illuminates the intended or predetermined
20 work area. As should be apparent, such adjustability may be
21 desirable dependent on the configuration, size, overall structure
22 or intended use of the device with which the various embodiments of
23 the illumination assembly are used.

24 Moreover, the ability to adjustably orient the one or more
25 LED's is further enhanced by the provision of cooperative

1 structures such as an extension assembly. The extension assembly
2 comprises an elongated neck or other structure which provides for
3 the outwardly spaced location of one or more LED's from the
4 mounting assembly with which they are associated. Such an
5 outwardly directed extension structure or assembly may be made from
6 a pliable material or alternatively may be pre-configured and
7 otherwise adjustably positionable relative to the mounting assembly
8 to which it is connected.

9 As set forth above, additional preferred embodiments of the
10 present invention contemplate various structural modifications of
11 the illumination assembly being integrated within or as part of the
12 utilitarian device itself. Such integrated embodiments may
13 therefore be part of the original manufacture of the instrument,
14 tool, utensil, etc. Accordingly, the light source and more
15 specifically one or more LED's are "built-in" the device and
16 specifically located thereon so as to facilitate the illumination
17 of the intended work area of the device. As a result, the
18 functionality of the device will be greatly enhanced without the
19 requirement of an external light source being attached thereto.
20 Due to the efficiently reduced size and weight of the various
21 components of the plurality of embodiments of the illumination
22 assembly the integration of the light source and power supply, as
23 well as other associated components, are such as to render the
24 illumination assembly of the present invention readily adaptable
25 for such integration at the time of the original manufacture of the

1 device. Accordingly the addition of an "inside" light and its
2 proper location and orientation will have the effect of minimizing
3 shadows frequently caused by the improper positioning of a light
4 source, both internally and externally mounted, as may be known in
5 related areas of endeavor. Also, the power supply in the form of
6 a removable and/or replaceable battery can be disposed within or
7 integrally or otherwise fixedly secured to the appropriate portion
8 of the device, depending on the physical characteristics of the
9 device. Similar to the embodiments described above, the light
10 source may comprise one or more LED's located at the "working end"
11 of the device or at other preferred locations in order to
12 illuminate the aforementioned undesirable creation of shadows or
13 dark areas in the field of the illuminated work area.

14 Various structural modifications of the integrated embodiments
15 of the illumination assembly include the wiring of the LED's and
16 the power source internally along various parts of the device with
17 which it is used. Also, the securement of the various components
18 of the illumination assembly may be accomplished by an overlying
19 molded plastic or like material covering. The covering may itself
20 contain the entire illumination assembly. As such, the housing,
21 support platform or like structure associated with the placement
22 and storage of the battery may come in different shapes and sizes
23 to compensate for the structure of the device on which it is
24 mounted. However, an important factor is the provision of
25 sufficient brightness and voltage of the required one or more LED's

1 to suit the specific industry standards of a given device.

2 Yet another preferred embodiment included in the "integrated"
3 category of the illumination assemblies involves the formation of
4 a plastic or other moldable material jacket or shell specifically
5 adapted to conform to all or at least portions of the size and
6 configuration of the device on which the illumination assembly is
7 to be mounted. Moreover, the various operative components of the
8 illumination assembly may be integrated directly in the molded
9 material shell or jacket, wherein the shell is mounted in
10 overlying, covering or otherwise attached relation to the device or
11 to predetermined portions thereof. Such attachment may be by
12 integrated molding, adhesive, inherently formed locking members or
13 tabs or a variety of other applicable means to attach or connect
14 the shell to the intended device.

15 As with the previously described "add-on" category of
16 illumination assembly embodiments, the "integrated" category of
17 illumination assembly embodiments may also include a light source
18 having one or more LED's. Similarly, one or all of the LED's may
19 be movable and therefore adjustable relative to the intended work
20 area, the device on which it is mounted and/or other of the
21 plurality of LED's defining the light source. Proper and selective
22 orientation of the light source is thereby accomplished in this
23 category of preferred illumination assembly embodiments as also
24 described in greater detail hereinafter.

25 These and other objects, features and advantages of the

1 present invention will become more clear when the drawings as well
2 as the detailed description are taken into consideration.

3

4 BRIEF DESCRIPTION OF THE DRAWINGS

5 For a fuller understanding of the nature of the present
6 invention, reference should be had to the following detailed
7 description taken in connection with the accompanying drawings in
8 which:

9 Figures 1 and 1a are side views of related preferred
10 embodiments of the illumination assembly of the present invention
11 as applied to a utilitarian device represented by a pair of
12 tweezers.

13 Figures 2 and 2a are side views of additional preferred
14 embodiments of the illumination assembly of the present invention
15 incorporating a mounting assembly differing from that of Figures 1
16 and 1a.

17 Figure 3 is a combination of the preferred embodiments of the
18 illumination assembly of the present invention as represented in
19 Figures 1 through 2a.

20 Figure 4 is a composite view of various embodiments of the
21 illumination assembly of the present invention mounted on or
22 connected to a plurality of different utilitarian devices.

23 Figure 5 is a side view of a preferred embodiment of the
24 illumination assembly of the present invention including a mounting
25 assembly in the form of a sleeve.

1 Figure 6 is a an exploded view of the various components
2 associated with the embodiment of Figure 5.

3 Figure 7 is a side view of the illumination assembly of the
4 present invention similar to the embodiment of Figure 5 and
5 including a different light source structure.

6 Figure 8 is a side view of yet another embodiment of the
7 sleeve mounting assembly as represented in Figures 5 through 7.

8 Figure 9a and 9b are end views of the embodiment of Figure 8
9 shown respectively representing open and closed positions.

10 Figure 10 is a side view of yet another embodiment of the
11 sleeve mounting assembly of the present invention.

12 Figures 11a and 11b are end views of the embodiment of Figure
13 10 respectively representing open and closed positions thereof.

14 Figure 12 is a side view of the embodiment of the mounting
15 assembly as shown in Figures 5 through 7.

16 Figure 13 is an end view of the embodiment of Figure 12
17 schematically representing the sleeve mounting assembly formed from
18 a resilient or expandable material.

19 Figures 14 is yet another preferred embodiment of the sleeve
20 mounting assembly of the present invention.

21 Figure 15 is a composite view representing the sleeve mounting
22 assembly in a plurality of different lengths.

23 Figure 16 is a perspective view of yet another preferred
24 embodiment of a mounting assembly associated with the illumination
25 assembly of the present invention.

1 Figure 16a is a perspective view of the embodiment of Figure
2 16 shown in an open position.

3 Figure 17 is a perspective view in exploded form of the
4 embodiments of Figures 16 and 16a.

5 Figure 18 is a perspective view of the embodiment of Figures
6 16, 16A and 17 shown in assembled form.

7 Figure 19 is a side view of the embodiment of Figure 18.

8 Figure 20 is a side view of the closing assembly of the
9 embodiment of Figures 16 and 16a including structural modification
10 of a light source associated therewith.

11 Figure 21 is a side view similar to the embodiment of Figure
12 20 showing an additional structural modification of a light source
13 associated therewith.

14 Figure 22 is a side view similar to the embodiment of Figure
15 21 showing yet another structural modification of a light source
16 associated therewith.

17 Figure 23 is a side view representing a closure assembly of
18 the embodiment of Figures 16 and 16a and including yet another
19 structural modification of the light source associated therewith.

20 Figure 24 is a side view of yet another preferred embodiment
21 of Figure 23 but incorporating the closure assembly of Figure 12.

22 Figure 25 is a composite view showing the closure assembly of
23 the embodiment of Figure 12 and incorporating a variety of
24 different structural modifications of a light source and power
25 supply which may be associated therewith.

1 Figure 26 is a detailed view in perspective showing yet
2 another preferred embodiment of a light source of the illumination
3 assembly of the present invention.

4 Figure 27 is an exploded view of the embodiment of Figure 26.

5 Figures 28 is a composite view showing the various structural
6 modifications of a light source of the illumination assembly of the
7 present invention.

8 Figure 29 is yet another preferred embodiment of the light
9 source of the illumination assembly of the present invention.

10 Figure 30 is a side view of yet another preferred embodiment
11 of the light source of the illumination assembly of the present
12 invention.

13 Figure 31 is yet another preferred embodiment of the light
14 source of the illumination assembly of the present invention.

15 Figure 32 is yet another preferred embodiment of a light
16 source of the illumination assembly of the present invention.

17 Figure 33 is yet another preferred embodiment of a light
18 source of the illumination assembly of the present invention.

19 Figures 34 and 35 are side views similar to the embodiment of
20 Figure 3 incorporating a different structural configuration.

21 Figure 36 is an exploded view showing yet another preferred
22 embodiment of a light source and associated power supply of the
23 illumination assembly of the present invention.

24 Figure 37 is a side view of yet another preferred embodiment
25 incorporating an electrical interface connection similar to the

1 embodiment of Figure 36.

2 Figure 38 is a perspective view of yet another preferred
3 embodiment of illumination assembly of the present invention
4 comprising an integrated or "built-in" construction.

5 Figure 39 is a side view of yet another preferred embodiment
6 of the integrated modification of the illumination assembly of the
7 present invention.

8 Figure 40 is yet another preferred embodiment of the
9 integrated structure of the illumination assembly of the present
10 invention.

11 Figure 41 is an exploded view of yet another preferred
12 embodiment of the integrated structure of the illumination assembly
13 of the present invention.

14 Figure 42 is a side view in assembled form of the embodiment
15 of Figure 41.

16 Like reference numerals refer to like parts throughout the
17 several views of the drawings.

18

19 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

20 As shown in the accompanying Figures, the present invention is
21 directed towards an illumination assembly generally indicated as 10
22 structured to be removably and adjustably connected to or mounted
23 on any one of a wide variety of utilitarian devices generally
24 indicated as 12 in Figures 1 through 3. For purposes of clarity,
25 various types of devices with which various embodiments of the

1 illumination assembly 10 may be used are represented in composite
2 form in Figure 4. Such devices include wrenches, screwdrivers,
3 saws, pliers, tire gauges, knives, containers, drills, scissors,
4 medical instruments, etc. It is emphasized that the composite
5 representation of Figure 4 is not meant to be all inclusive but
6 rather it is representative of an even larger number of devices
7 typically, but not necessarily, operative while being hand held.

8 In order to simplify and further clarify the structural and
9 operational details of the illumination assembly 10 of the present
10 invention, its removable and adjustable attachment, as shown in
11 Figures 1 through 3 as well as its integration into a device 12'
12 will be represented wherein the device 12 and 12' will be
13 consistently presented as a pair of tweezers. However it is again
14 emphasized that each of the preferred embodiments of the
15 illumination assembly 10 of the present invention can be adapted
16 with little or no structural modification for use on any of an
17 extremely large number of utilitarian devices of the type, but not
18 limited to, those disclosed in the composite of Figure 4. Further,
19 the specific structural components of each of the plurality of
20 preferred embodiments of the illumination assembly 10 will be
21 described in greater detail with specific reference to Figures 5
22 through 37. However, it is recognized that for purposes of a
23 detailed description, the illumination assembly having various
24 structural modifications representative of and at least partially
25 defining the plurality of preferred embodiments, will be

1 consistently represented in the accompanying Figures as reference
2 numeral "10".

3 Therefore, with primary reference to Figures 1 and 1a, the
4 illumination assembly 10 comprises a mounting assembly generally
5 indicated as 14 preferably in the form of a sleeve 16 disclosed and
6 to be described in detail with reference to Figures 5 through 15.
7 A light source 18 and a power supply 20 are mounted on or connected
8 to an exterior of the mounting assembly 16. When applied to the
9 device 12 the illumination assembly 10 is fitted thereon by
10 removably and adjustably positioning the mounting assembly 14 at an
11 appropriate location relative to a predetermined and/or intended
12 work area. It is of course to be understood that the intended work
13 area will differ dependant upon the type of the device 12 as well
14 as its intended use and application. Therefore, the specific
15 location of the illumination assembly 10 may vary greatly in order
16 to accomplish a maximum or appropriate level of illumination of the
17 intended work area. With reference to Figures 2 and 2a, the
18 illumination assembly 10 comprises a mounting assembly 14' which
19 differs from that of the embodiment of Figures 1 and 1a and which
20 will be described in greater detail in herein after with specific
21 reference to Figures 17 through 22. However, common to both the
22 mounting assemblies 14 and 14' is the ability to be removably and
23 adjustably mounted on or connected to any of a plurality of
24 different portions of a device 12 in order to most effectively
25 illuminate a predetermined work area of the device 12.

1 As shown in Figure 3 the device 12, again depended upon its
2 use and structural or physical characteristics, may include a
3 plurality of different types of illumination assemblies 10. The
4 individual illumination assemblies 10 include different ones of the
5 mounting assemblies 14 and 14' as well as modifications both in
6 structure, quantity and placement with the various light sources
7 18. However, it is emphasized in each of the preferred embodiments
8 of the present invention the light source 18 may include at least
9 one but in many instances a plurality of light generating elements.
10 Further, as will be emphasized throughout the description of the
11 present invention, the one or more light generating elements are
12 preferably defined by light emitting diodes (LED). Each of the
13 light generating elements or LED's may differ in their structure
14 and operational performance by being either fixed or adjustable as
15 described in greater detail with specific reference to Figures 26
16 through 37.

17 Therefore, as generally represented in the embodiments of
18 Figures 1, 1a, 2, 2a and 3, any number of utilitarian devices may
19 include one or more illumination assemblies 10. Further, each of
20 the one or more illumination assemblies 10 may include a light
21 source having by one or more LED's and one or more power supplies
22 electrically connected thereto so as to provide operative energy
23 for the activation of the one or more LED's. Each of the one or
24 more LED's may be either fixed or adjustable into a preferred
25 orientation, relative to the intended work area of the device 12,

1 the mounting assembly 14 or 14' to which they are connected as well
2 as others of a plurality of LED's associated with the same
3 illumination assembly 10.

4 With primary reference to Figures 5 through 15 the sleeve 16
5 of the mounting assembly 14 comprises a substantially hollow
6 interior 19 and two oppositely disposed open ends. The sleeves 16
7 may include structural modifications which may be considered
8 additional preferred embodiments of the illumination assembly 10 of
9 the present invention. However, common to each of the sleeves 16,
10 16' 16" and 16'', the light source 18 and the power supply 20 are
11 mounted on an exterior surface or other exposed portion thereof.
12 As shown in Figure 6, the light source 18 includes at least one LED
13 25 secured to a mount 27 which itself may assume a variety of
14 different structural configurations, sizes, etc. The power supply
15 20 may be secured to a base or housing 20', wherein both the light
16 source 18 and the power supply 20 are secured to a common support
17 platform 28 in substantially adjacent relation to one another.

18 An electrical conductor or other appropriate means of
19 establishing electrical interconnection between the power supply 20
20 and the light source 18 may be incorporated within the platform 28,
21 as at 30, or may be separate therefrom. Also, attachment or other
22 disposition of the light source 18 and power supply 20 may be
23 accomplished by securing the support platform 28 by means of
24 individual, separate connectors 30 fitted into or cooperatively
25 structured to be received at or about socket or recess areas 32

1 formed in the platform 28. It is also to be noted that a variety
2 of other appropriate means of attachment of the platform 28 to the
3 mounting assembly 12 can be utilized such as adhesive, heat
4 welding, etc.

5 As represented in the preferred embodiment of Figure 7 various
6 operative components of the illumination assembly 10 can vary and
7 still be incorporated within the intended spirit and scope of the
8 present invention. More specifically, the light source 18, may
9 include a connector 31 having one or more LED's 25 secured thereto
10 and being disposed in an outwardly, easy adjustable location
11 relative to the platform 28 and the mounting assembly 14. This
12 outwardly disposed connector 31 may be in the form of a pliable,
13 wire or arm-like attachment which, due to its pliable nature
14 facilitates the selective orientation of the light source 18 in any
15 of a number of different positions to accomplish appropriate
16 illumination of the work area.

17 Figures 8, 9a and 9b disclose yet another preferred embodiment
18 of the sleeve 16' which includes an access opening 33 extending
19 along its length. A closure 35 is connected to or otherwise
20 directly associated with the access opening 33 such as by being
21 secured to peripheral edges or portions thereof as at 35'.
22 Similarly, the embodiment of Figures 10, 11a and 11b disclose the
23 sleeve 16" having an access opening 33 extending along the length
24 thereof, wherein the closure assembly 37 is in the form of a hook
25 and loop type fastener or other easily removably attachable

1 fastener structure facilitating the opening and closing of the
2 access opening 33. Similar to the embodiment of Figures 9a and 9b,
3 the hook and loop type fastener 37 may be secured to opposite
4 peripheral or adjacent portions of the access opening 33 as at 37'.
5 As clearly shown in Figures 9a and 9b and 11a, 11b provision of the
6 access opening 33 and the respective closure assemblies 35 and 37
7 facilitate the sleeve 16' and 16" being selectively disposed
8 between an open position (9a and 11a) and a closed position (9b and
9 11b). Accordingly, when in the open position, an appropriate
10 portion of the device 12 to which the illumination assembly 10 is
11 attached may pass transversely through the access opening 33.
12 Thereafter, the sleeve-like closure assembly 14 is disposed in its
13 closed position so as to substantially surround and at least
14 partially enclose a corresponding portion of the device 12 to which
15 it is attached.

16 Figure 12 represents the preferred embodiment of the sleeve 16
17 of closure assembly 14 as demonstrated in Figures 5 through 7.
18 More specifically, the sleeve 16 may be formed of a flexible, at
19 least minimally elastic material. As demonstrated by the
20 directional arrows of Figure 13, the sleeve 16 can expand
21 outwardly, if needed, to accommodate the size and other structural
22 characteristics of the portion of the device 12 to which it is
23 attached. Such elastic qualities of the sleeve 16 enable it to be
24 removably secured to various portions of the device 12 where
25 appropriate, while at the same time allowing it to be easily

1 adjustable either along its length or rotationally as demonstrated
2 by the appropriate directional arrows 15 of Figures 3. However, it
3 should also be noted that the sleeve 16, when intended for use on
4 somewhat larger devices than the representative tweezers of the
5 accompanying drawings, may be formed from a rigid or semi-rigid
6 material to facilitate the stability of the illumination assembly
7 10 when connected to such a larger device.

8 Additional structural modifications of the sleeve 16" include
9 a tapered configuration generally indicated as 17. As represented
10 in Figure 14, at least one of two oppositely disposed open ends
11 communicating with the hollow interior 19 may be tapered so as to
12 better conform to the dimension or configuration of the device to
13 which it is connected. The sleeve 16" may also be formed of
14 either a flexible, at least minimally elastic material as with the
15 embodiment of Figure 12 or may be formed of a rigid or semi-rigid
16 material as described above. Further, any of the embodiments of
17 Figures 8 through 14 may vary in length as demonstrated by the
18 composite representation of Figure 15. The preferred length of the
19 sleeve 16 will of course be dependant upon the device to which it
20 is attached including its size, configuration, placement of the
21 mounting assembly 14 and the intended use of the device.

22 With primary reference to Figures 16 through 22, the mounting
23 assembly 14, as set forth above with reference to Figures 2 and 2a
24 may differ from the sleeve 16 as described in detail with reference
25 to Figures 5 through 15. More specifically, the mounting assembly

1 14 of the embodiment of Figures 17 through 22 comprises a clamp
2 assembly 40 having a support platform which may be in the form of
3 an elongated, substantially cylindrical housing 42 and a plurality
4 of flanges. There is preferably provided two flanges 44 and 46
5 movable relative to the housing 42 and extending outwardly
6 therefrom. As shown in the embodiments of Figures 17 through 19,
7 when the housing 42 is defined by a continuous cylindrical
8 configuration extending along substantially the entire length of
9 the clamp assembly 40, the light source 18 and the power supply 20
10 may be secured to opposite ends thereof. However, the dimension,
11 configuration and location of the cylindrical housing 42 may vary
12 as at 42' in the embodiments of Figures 21 and 22 such that the
13 light source, including one or more LED's 25 may be connected
14 adjacent to the housing 42' such as on a support platform 28'
15 similar to that described with the embodiments of Figures 5 through
16 7.

17 Alternatively, Figure 20 discloses the flat or other non-
18 cylindrical configuration of the support platform 28 while still
19 being associated directly with and defining a portion of the clamp
20 assembly 40 including the outwardly extending flanges 44 and 46.
21 Other structural features associated with the clamp assembly 40 as
22 demonstrated in the embodiments of Figures 16 through 18 include
23 the provision of a biasing assembly. In the embodiment of Figure
24 17 the biasing assembly comprises at least one biasing spring or
25 like member 48 attached to and made apart of the clamp assembly by

1 being disposed in biasing engagement with the flanges 44 and 46.
2 More specifically, the biasing member 48 may be disposed in
3 receiving relation within a recess or formed groove 49. In such a
4 position, corresponding portions of the biasing member 48 engage
5 and tend to normally bias the flanges 44 and 46 into a closed or
6 gripping position demonstrated in Figure 16. Due to the fact that
7 the flanges 44 and 46 are at least minimally movable relative to
8 the housing and support platform 42, 28 the flanges 44 and 46 may
9 be separated to accommodate and receive an appropriate portion of
10 a device 12 as clearly represented in Figures 2, 2a and 3, as set
11 forth above. Further the flanges 44 and 46 may include initially
12 separable peripheral portions or lips as at 51 to facilitate the
13 spreading of flanges 44 and 46 and access to the interior thereof
14 as indicated by directional arrows 53.

15 Also in at least one preferred embodiment one or more of the
16 flanges 44 and 46 may include indentations or groove segments 55
17 formed therein such that a portion of the device 12 to which they
18 are attached, such as the leg of tweezer as demonstrated in Figures
19 2 and 2a will be received in a stable manner within such grooves
20 55. It should be apparent that through action of the biasing
21 means, such as the biasing member 48, the flanges 44 and 46 are
22 biased into a gripping or clamping engagement with a corresponding
23 portion of the device 12. Such a gripping or clamping action still
24 allows for the longitudinal sliding placement or positioning of the
25 corresponding illumination assembly 10 on various portions of the

1 device 12 and/or alternatively allows for the rotation thereof as
2 demonstrated by directional arrow 15' of Figure 3.

3 It should be further noted that the aforementioned biasing
4 means may take the form of an "inherent bias" such as by the clamp
5 assembly 40 being formed from a moldable, inherently resilient
6 material such as plastic, metal, etc. As such the flanges 44 and
7 46, while still being movable relative to the housing 42 or support
8 platform 28, are inherently biased into the closed position of
9 Figures 16. Separation of the flanges 44 and 46 may occur due to
10 the spread lip configuration of 51 to at least temporarily dispose
11 the flanges 44 and 46 into the open position of Figures 16a. The
12 open position facilitates placement of a corresponding portion of
13 the device 12 into the interior of the clamp assembly 40 as
14 indicated by directional arrows 53.

15 With reference to Figures 23 and 24 the versatility and
16 structural adaptability of the various preferred embodiments of the
17 illumination assembly 10 is demonstrated by the power supply 20 and
18 a variety of different light sources 18' being mounted on different
19 ones of the mounting assemblies 14 such as the clamp assembly 40
20 and the sleeve 16. The preferred embodiments of the light source
21 is indicated as 18' in Figures 23 and 24 will be described in
22 greater detail with specific reference to Figures 31 through 36.
23 Figure 25 represents a composite of a plurality of various
24 structural modifications each defining yet additional preferred
25 embodiments of the illumination assembly 10 of the present

1 invention. As disclosed, a mounting assembly 14 which may be in
2 the form of sleeve 16 or clamp assembly 40 may be disposed in
3 supporting, connecting relation to a variety of different
4 combinations of light sources 18 and power supplies 20. Further as
5 will be explained in even greater detail with reference to Figures
6 26 through 28 the various light sources 18 including one or more
7 LED's 25 may be fixed or adjustably/movably ported relative to a
8 corresponding one of the mounting assemblies 14 such that either or
9 both the mounting assembly 14 and/or the individual light sources
10 18 and one or more LED's 25 associated therewith, facilitate the
11 adjustable positioning of the light source 18 as well as the
12 selective orientation of the one or more LED's 25 relative to the
13 work area of the device 12, which is intended to be illuminated.

14 Such selective orientation and adjustable positioning of the
15 light source 18 is further demonstrated in the structural features
16 of the preferred embodiments of Figures 26 through 30. More
17 specifically, Figure 26 discloses a light source 18 which is
18 capable of both rotational movement as indicated by directional
19 arrow 60 and linear, pivotal or twisting movement as indicated by
20 directional arrow 62. In accomplishing such universal type
21 movement an attendant orientation of the LED 25 as well as the
22 overall light source 18, the mount 50 includes a cap or head
23 portion 52 removably secured to a base 54 preferably by means of a
24 "snap-fit" type of connection. Such snap-fit connection is
25 accomplished by cooperative dimensioning and positioning of

1 corresponding peripheral edges 52' and 54' disclosed in Figure 27.
2 Therefore, the head or cap 50 may be "press fitted" onto the base
3 54 wherein sufficient tolerances are built into the peripheral
4 portions 52' and 54' to facilitate the snap-fit connection while
5 still allowing for the rotational and pivotal or twisting movement
6 60 and 62 respectively.

7 As represented, the cap 52 is rotational as indicated by
8 directional arrow 60, relative to the base 54 while concurrently
9 allowing the vertical or other directional twisting or pivoting of
10 the LED 25 relative to the cap 52 and base 54 as indicated by
11 directional arrows 62. The aforementioned rotational, pivotal
12 twisting or like movement of the LED 25 is accomplished by a pin
13 and hinge type of attachment utilizing conventional or customized
14 connector members 57. Therefore, the LED 25 and cooperative
15 components of the light source 18 can be said to move concurrently
16 in substantially transverse axes defined by the rotational axes of
17 the head 52 relative to base 54 and the pivotal axes at least
18 partially defined by the connecting pin of the connector members 57
19 represented in Figure 27.

20 Figures 28 through 30 represent other structural modifications
21 of the light source 18, wherein the cap or head 52 is fixedly
22 secured to the base 54 and/or movable thereto as represented in
23 Figure 27 and further wherein one or more LED's 25 may be fixedly
24 secured to the cap 52 in a variety of different locations as
25 indicated by the composite of Figure 28. In addition, Figure 29

1 shows that the head or cap 52 is fixed relative to the base 54 and
2 the LED 25 and mount 27 are interconnected by the hinge type
3 connectors 57 (Fig. 27) to accomplish the reciprocal pivotal
4 movement demonstrated by directional arrows 62 in Figure 26.
5 Somewhat similarly, the embodiment of Figure 30 has been at least
6 briefly described above as providing a fixed or movable
7 interconnecting cap 52 and base 54 supporting LED 25 and mount 27
8 by means of an outwardly extending pliable material connecting arm
9 or like structure 21.

10 The embodiments of Figures 31 through 37 are directed to an
11 extension assembly which is representative of yet another preferred
12 embodiment of the light source 18 incorporated within the
13 illumination assembly 10. More specifically the mount 50 may
14 include the head or cap 52 being fixedly or movably secured to the
15 base 54. In addition, an extension assembly includes an elongated
16 extension arm 66 having a light source 18 secured thereto. In the
17 embodiments of Figures 31 and 32 the light source 18 may include
18 one or more LED's 25 secured adjacent or contiguous to the outer
19 end of the extension neck 66. In the embodiments of Figures 33
20 through 35 the extension neck 66' may be modified to have a
21 substantially linear configuration or alternatively an angular or
22 arced configuration.

23 Further structural modification of the extension neck 66'
24 includes the provision for mounting a plurality of LED's preferable
25 in succession, along at least a portion of the length of the

1 extension neck 66' in order to further facilitate the versatility
2 and adaptability in illuminating a predetermined work area of the
3 device on which the light source 18' is supported or connected.
4 Further structural modifications, defining at least yet another
5 preferred embodiment of the illumination assembly of the present
6 invention is demonstrated in Figure 36. More specifically, the
7 extension neck 66' of the light source 18' is connected to the
8 power supply 20' by means of an electrically coupling interface
9 generally indicated as 70. The interface 70 includes a plug and
10 receiving pin 72 and 74 respectively disposed and structured for
11 detachable connection to one another wherein the power supply 20',
12 including a contained battery is connected to the coupling
13 interface pin 74 by appropriate conductors as at 76. The plug may
14 be imbedded in or otherwise secured to the mount 50. Obviously the
15 plug and the pin arrangement can be reversed such that the plug 72
16 is mounted on the support platform 28 in association with the base
17 segment 54 rather than with the cap or head portion 52 of the mount
18 50.

19 Movable adjustment of the entire extension neck 66' can be
20 readily accomplished in either a rotational, pivotal or reciprocal
21 twisting movement as demonstrated with respect to the embodiment of
22 Figure 26 due at least in part to the interconnection between the
23 base segment 54 and the head 52 as described with reference to
24 Figure 27 and the fact that the connecting conductors as at 76' are
25 loosely disposed and/or are sufficient length to accommodate the

1 aforementioned diverse or universal type of movement. Figure 37
2 represents yet another embodiment of the coupling interface as at
3 70' comprising a plug or receptor 72' disposed and structured to
4 receive a cooperatively structured receptacle pin (not shown for
5 purposes of clarity) which may be associated with an "external"
6 power supply rather than the contained, cooperatively disposed
7 power supply 20 normally directly associated with the light source
8 18.

9 With primary reference to Figures 38 through 42 additional
10 preferred embodiments of the illumination assembly are disclosed
11 therein which are distinguishable from the above-noted preferred
12 embodiments of Figures 1 through 37. More specifically, the
13 preferred embodiments of Figures 38 through 42 are distinguishable
14 by being substantially integrated or "built-in" rather than being
15 removably attached and/or mounted on various ones the plurality of
16 devices 12' as described above. For purposes of consistency and
17 clarity, each of the devices 12' referred to hereinafter will also
18 be represented by a tweezer like structure. However, as with the
19 other preferred embodiments set forth in Figures 1 through 37, the
20 device 12' may be any of any of an extremely large number of
21 utilitarian devices of the type, but not limited to, those devices
22 set forth in the composite of Figure 4. As such, the preferred
23 embodiments of Figures 38 through 42, being integrated into the
24 individual devices 12', are absent a mounting assembly 14 of the
25 type set forth above with specific reference to the sleeve type

1 mounting assembly 16 or the clamp assembly 40.

2 The illumination assembly generally indicated as 80 of the
3 integrated category of preferred embodiments include a light source
4 82 comprising one or more light generating elements 82, wherein
5 each of the light generating elements 82 are preferably in the form
6 of an LED of the type set forth above. Similarly, the light source
7 82 may include an adjustable mount such as of the type indicated
8 generally as 50 and including a base 54 and a head or cap portion
9 52. Such mount structure 50 may be structured to be a fixed one
10 piece construction as demonstrated in the composite of Figure 28 or
11 may be universally movable as indicated by directional arrows 60
12 and 62 represented in Figure 26. However, it should be noted that
13 the light source 82 comprising one or more LED's may be otherwise
14 structured to best accommodate its integrated inclusion within any
15 one the plurality of devices 12' with which it is associated.

16 In that the ultimate goal is to accomplish a desired or
17 maximum level of illumination of the work area of the device 12',
18 such desired amount of illumination may be accomplished by
19 providing a plurality of light sources and associated LED's in
20 different, spaced apart and/or substantially adjacent portions of
21 the device 12'. The desired illumination may also be accomplished
22 by allowing the LED or other operative components of the light
23 source 82 to be adjustable in order that the light source may be
24 selectively positioned on the device 12' while the one or more
25 LED's associated therewith may be selectively oriented relative to

1 the work area of the device 12' and/or of the device itself.

2 Accordingly, with reference to the embodiments of Figures 38
3 and 39, a power supply generally indicated as 84 is also integrated
4 within the device 12' such as by including one or more replaceable
5 batteries within a housing 86. A closure member 88 may be
6 removably attached to the housing 86 in order to facilitate access
7 to the interior thereof and to the batteries contained therein.

8 The power supply or batteries contained within the housing 86
9 is electrically connected to the light source to provide sufficient
10 energy to activate the one or more LED's associated therewith. As
11 such, one or more conductors 90 are located within the interior of
12 appropriate interconnecting portions of the device 12, as shown in
13 Figure 38 or alternatively may be disposed along an exterior
14 surface as at 90' in Figure 39. In this latter embodiment the
15 conductor 90' as well as certain other operative components of the
16 light assembly 80 may be "integrated" into the device 12' by means
17 of encapsulating the conductor 90' and/or other operative
18 components within or beneath a dipped or molded plastic, rubber or
19 like material outer coating. It is of course noted that the
20 specific location or placement of the light sources 82, the
21 conductors 90, 90' as well as the location, configuration and
22 dimension of the housing 86 of the power supply 84 may vary
23 dependant upon the physical characteristics and use of the
24 particular device 12' with which the illumination assembly 80 is
25 used.

With primary reference to Figures 40 through 42, yet another preferred embodiment included within the integrated category of illumination assemblies comprises a jacket or overlying covering generally indicated as 12". The jacket 12" will be formed from a moldable plastic or like material capable of being fabricated, using any appropriate means, to a size and configuration corresponding to that of the actual device 12'. Figure 41 discloses the jacket or covering 12" in an unassembled position, wherein the indicated directional arrows are representative of the placement of the true device 12' into the jacket or shell assembly 12". In the specific representation where 12' is a tweezer type of structure, the head or stem 94 is received within a socket 94' of the shell 12" as clearly indicated. The power supply generally indicated as 84, including the housing 86 may be integrally or otherwise fixedly secured to the shell or jacket 12" as indicated. Similarly, one or more electrical conductors 90 are integrated within or otherwise fixedly secured to the various correspondingly disposed portions of the shell or jacket 12" in order to establish electrical connection between the power supply 84 and the one or more light sources 82. Specific mounting and securement of the shell or jacket 12" may be accomplished by a number of appropriate connecting means. One example thereof would be the provision of mounting or connecting tabs 96 secured to appropriate portions or surfaces of the shell 12" as clearly indicated in Figure 40. Obviously other means of attachment may be utilized to facilitate

1 a secure and sometimes permanently fixed integration of the shell
2 or jacket 12" and the device 12'.

3 Since many modifications, variations and changes in detail can
4 be made to the described preferred embodiment of the invention, it
5 is intended that all matters in the foregoing description and shown
6 in the accompanying drawings be interpreted as illustrative and not
7 in a limiting sense. Thus, the scope of the invention should be
8 determined by the appended claims and their legal equivalents.

9 Now that the invention has been described,

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